

Chief Information Officer's Section
Office of the Governor
State of Utah

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Utah Technical Architecture: Information Technology Product Standards

Introduction and Scope

The purpose of this document is to identify significant technology product standards that have been deployed on a large scale across the enterprise as a resource for agency use during the redesign or development of information technology projects. Products referenced in this document are related to technologies referenced in other State technology policies, guidelines, and standards that may not reference specific products.

Utah Code 63D-1-301.5 et seq requires the Chief Information Officer (CIO) working with the Information Technology Policy and Strategy Committee (ITPSC) to adopt rules, policies, procedures, standards, and guidelines to manage the state's information resources. The statute asserts that state executive branch agencies shall cooperate in complying with the rules, policies, procedures, and standards, and guidelines adopted, and that the CIO shall have the review and oversight responsibility for assuring that agencies' planning, acquisition, and implementation activities are consistent with statewide policies and directions.

Utah Technical Architecture Overview

Utah's Strategic Information Technology Plan: Making IT Happen called for the creation of an architectural framework for the state. Goal number five, which focuses on sharing data and IT resources, specifically calls for a "state-wide architecture, technology, documentation standards, and data standards. The reasons for doing this are to enhance communication, collaboration, the sharing of information and information technology resources, and to provide information technology resources at the lowest possible cost."

A statewide technical architecture can be defined as a logically consistent set of principles that:

- ?? Are derived from agency practices and requirements,
- ?? Guide the engineering of the state's information systems and technology infrastructure,
- ?? Are understood and supported by agencies and management,
- ?? Establish statewide technology standards where needed to guide buying decisions,
- ?? Take into account the full context in which the architecture will be applied, and
- ?? Provides for consistency in implementation and problem solving.

The goal is to provide technical architecture for the state that can rapidly adapt or respond to the changing business and information needs of the state. Over time the technical architecture definition has evolved to include eight overall architectures that encompass the information technology needs of the state. The CIO and the ITPSC have approved all the architectures identified for development. The architectures identified include the following: Application Architecture; Collaboration and Workflow Architecture; Data and Information Architecture; Electronic Commerce Architecture; Network Architecture; Platform Architecture; Security Architecture; and Systems Management Architecture.

Standard Type Definitions

The categories or guidance levels of standards referenced in this document include:

Approved: An *Approved* standard is critical to the Enterprise and will be enforced. The numbers of standards in this category will be minimal.

Best Practices: A *Best Practices* standard produces superior results for the enterprise. Agencies are accountable to justify a departure from best practice standards.

De Facto: A *De Facto* standard identifies choices that are widely accepted because of widespread use within the enterprise whether or not they qualify for an actual *Best Practices* designation.

Sustained: A *Sustained* standard indicates a standard or practice that no longer shows promise but is still used or even expanded because of a prior standards solution.

Migrate From: A *Migrate From* designation refers to a standard or practice that has been abandoned for a better solution. It is not a favored standard yet continues to be in use around the enterprise. Agencies should plan to migrate away from solutions assigned with this designation

Emerging: *Emerging* standards may have future value within the enterprise but have proven no specific benefit at the time. The enterprise may be conducting a pilot project to establish the potential benefits and risks of selecting this standard.

Technical Architectures

Application Architecture

Scope

Application architecture identifies criteria and techniques associated with the design of applications that can be modified to respond to the states changing business needs, with appropriate consideration for changing and emerging technologies. This architecture focuses upon client-server and web-centric applications development including Internet and Intranet applications; designing manageable applications, applications middleware; and project management tools and development methodologies. The architecture is composed of the following technology components:

- ~~///~~ Client-server Application Architecture
- ~~///~~ Application Communication Middleware
- ~~///~~ Application Integration Architecture
- ~~///~~ Web Architecture (Internet/Intranet/Extranet)
- ~~///~~ Application Manageability Architecture
- ~~///~~ Object and Component Architecture
- ~~///~~ Development and Test Environments

Summary of Product Standards

Description	Review Period	Standard Type	Product or Technology	State Contract(s)
Application Communication Middleware	Annual	De Facto De Facto Sustained	IBM MQ Series® CORBA COM & DCOM	MA130
Application Integration Architecture: Application Servers	Annual	De Facto De Facto Migrate From Migrate From Emerging	IPlanet® WebSphere® NetDynamics® Silverstream® JBOSS	
Application Manageability Architecture: Data Modeling	Annual	Best Practices	ERWIN	
Application Manageability Architecture: Version Control	Annual	Sustained Emerging	CSV Interwoven®	PA655
Web Architecture: Browser Clients	Annual	De Facto Sustained Migrate From Migrate From	IE 6X or > Netscape 6X or > Thick Clients Browser Versions <6X	
Web Architecture: Content Management	Annual	De Facto	Interwoven®	PA655
Web Architecture: Portal Services	Annual	De Facto	NPS® 2X or >	PA655
Web Architecture: Reporting		De Facto Migrate From De Facto Sustained	Actuate® 6X or > Actuate® 5X or < Cognos Reports® Crystal Reports®	006218 996451
Web Architecture: Web Page Design Software	Annual	De Facto Sustained Sustained Sustained	DreamWeaver® MS FrontPage® MS Interdev® Cold Fusion®	AR1429
Web Architecture: Web Servers	Annual	De Facto Emerging	IPlanet® Apache®	

Draft for Comment

Object and Component Architecture		De Facto Emerging Migrate From	J2EE .NET C++, Visual BASIC	AR1429
Object and Component Architecture: Development Environments		De Facto Migrate From Migrate From Migrate From	J2EE Power Builder® Natural® 3.1.5 or > Delphi®	

State Policy, Standards and Related References:

State of Utah Framework for Developing Web Applications, Draft document for ITPSC comment and review 12/21/01

State of Utah Web Standards, Approved by the ITPSC 1/18/01.

Collaboration and Workflow Architecture

Scope

Collaboration and workflow architecture establishes a foundation for collaboration, communication, and workflow. Collaboration and workflow focuses on office and ad hoc workgroups, while communication focuses on sharing information both within and outside the state. The architecture is composed of the following technology components:

- ~~///~~ Content Exchange Architecture
- ~~///~~ Electronic Mail Architecture
- ~~///~~ Calendaring and Scheduling Architecture
- ~~///~~ Imaging Systems Architecture: Electronic Document Management Systems (EDMS)
- ~~///~~ Business Process Management (BPM) and Workflow Architecture
- ~~///~~ Enterprise Application Software (EAS) Architecture

Summary of Product Standards

Description	Review Period	Standard Type	Product or Technology	State Contract(s)
Electronic Mail Architecture	Annual	De Facto Migrate From	GroupWise® 6X or > GroupWise® 6X or <	PA655
Calendaring & Scheduling Architecture	Annual	De Facto Migrate From	GroupWise® 6X or > GroupWise® 6X or <	PA655
Imaging Systems Architecture: EDMS	Annual	De Facto	IBM Content Manager® 6.1 or > and related products	PD1132
BPM & Workflow Architecture	Annual	De Facto Migrate From	eWork® Informs®	PA655
EAS: Office Suites	Annual	Approved Sustained Migrate From Migrate From Sustained* Emerging	MS Office 2000XP® MS Office 2000® MS Office 97® MS Office 95® WordPerfect Office StarOffice®	AR1429
EAS: Geographic Information Software	Annual	De Facto	ESRI	PA-076
EAS: CAD Software	Annual	De Facto	AutoCAD R14 or >	PA487
EAS: Graphics	Annual	De Facto	MS Visio 2000®	AR1429
EAS: Desktop DBMS	Annual	De Facto Sustained Migrate From	MS Access® 2000XP MS Access® 2000 MS Access® 97 or <	AR1429
EAS: Presentation Software	Annual	De Facto	MS PowerPoint®	AR1429

*WordPerfect Office is supported only in those agencies where specific exceptions have been approved such as the Attorney General's office.

State Policy, Standards and Related References:

Policies for Migrating from Corel Office to Microsoft Office, Presented to the ITPSC and approved January 21, 1999.

Data and Information Architecture

Scope

The data and information architecture provides high quality, consistent data for online transactional processing (OLTP), where and when it is needed. The architecture also provides standards for accessing data for online analytical processing (OLAP), including executive information systems and decision support systems. The architecture is composed of the following technology components:

- ~~///~~ Database Management Systems (DBMS) Architecture
- ~~///~~ Data Access Middleware Architecture
- ~~///~~ Data Access Integration Architecture
- ~~///~~ Data Warehouse Architecture
- ~~///~~ Data Repository Architecture
- ~~///~~ Data Hygiene Architecture
- ~~///~~ Data Extraction and Transformation Architecture
- ~~///~~ Data Replication Architecture
- ~~///~~ Business Intelligence Architecture

Summary of Product Standards

Description	Review Period	Standard Type	Product or Technology	State Contract(s)
DBMS Architecture	Annual	De Facto Migrate From De Facto Emerging Sustained Sustained Sustained Emerging Emerging	Oracle 8i® or > Oracle 8® or < DB2® MS SQL Server® Sybase® Informix® ADABAS® Terradata® MySQL PostgreSQL	AR867 MA130 AR1429 PD504 PD502
Data Access Middleware Architecture	Annual	De Facto De Facto Migrate From	IBM MQ Series® CORBA COM & DCOM	MA130
Business Intelligence Architecture	Annual	De Facto	Cognos®	996451

State Policy, Standards and Related References:

(Insert References)

Electronic Commerce Architecture

Scope

Electronic commerce architecture identifies electronic commerce implementation requirements and browser interfaces required to facilitate government commerce and on-line public access to government information and services. The architecture is composed of the following technology components:

- ~~///~~ Card Verification and Payment Services Architecture
- ~~///~~ Data Interchange (EDI) Architecture
- ~~///~~ Digital Signature Architecture
- ~~///~~ Electronic Funds Transfer Architecture
- ~~///~~ Electronic Benefits Transfer Architecture
- ~~///~~ Electronic Check Architecture

Summary of Product Standards

Description	Review Period	Standard Type	Product or Technology	State Contract(s)
Card Verification & Payment Services	Annual	De Facto	(Insert Contracted Vendors)	
Data Interchange EDI Architecture	Annual	De Facto De Facto	X.12 XML	
Digital Signature Architecture	Annual	De Facto	DST Identity Authentication Services and Certificates	AR1216
Server Certificates	Annual	Best Practices Emerging	Verisign® SSL Certificates DST® Server Certificates	

State Policy, Standards and Related References:

Certificate Policy: Personal Assurance Level and Electronic Assurance Level, September 5, 2000.

Uniform Electronic Transactions Act, Utah Code 46-4-101 et seq, as of May 3, 2002

Utah Digital Signature Act Rules, Rule R154-10, in effect as of April 1, 2002.

Network Architecture

Scope

The network architecture defines interconnectivity and provides the communication infrastructure for distributed applications and business locations. The architecture is composed of the following technology components:

- ~~///~~ Directory Services Architecture
- ~~///~~ Local Area Network (LAN) Architecture
- ~~///~~ Wide Area Network (WAN) Architecture

Summary of Product Standards

Description	Review Period	Standard Type	Product or Technology	State Contract(s)
Directory Services Architecture	Annual	De Facto Emerging	eNDS® 8.6X or > openLDAP	PA655
LAN & WAN Architecture: Software (Print & File Services)	Annual	De Facto Migrate From Emerging	NetWare® 6X or > NetWare® 6X or < UNIX/LINUX with NFS/Samba/Lpd	PA655
LAN & WAN Architecture: Switches and Routers	Annual	De Facto Migrate From Emerging Emerging Migrate From Migrate From	Cisco® (265x, 36xx) Cisco® (720x, 75xx Routers) Cisco® (295x, 355x, 4000 Series, 5000 Series, 6000 Series Switches) IGX ATM Switches and ONS Optical Networking Other vendor products Evaluated for inclusion Xylan® 3COM®	AR794, AR 877 AR1464
LAN & WAN Architecture: Wireless	Annual	De Facto Emerging Emerging	Cisco®Aironet 3COM Other vendor products Evaluated for inclusion	AR1191, AR 877 AR1464

State Policy, Standards and Related References:

Network Access Policy, Approved by the ITPSC 3/28/02

State User Authentication Policy, Draft for review and comment by the ITPSC 6/27/02

Utah Master Directory: Design Document, Submitted to the ITPSC for review and comment on 6/27/02

Utah State Wide Area Network Fault Tolerant Plan, May 2001, Discussed and approved by the ITPSC as the WAN Redesign Project in July 2001.

Wireless LAN/WAN Standard Revision, Approved by the ITPSC 3/28/02

Platform Architecture

Scope

Platform architecture identifies hardware and associated operating systems supporting the states client-server architecture. Platform architecture also identifies major associated hardware peripheral products. The architecture is composed of the following technology components:

- ~~///~~ Mainframe Architecture
- ~~///~~ Server Platform Architecture
- ~~///~~ Client Platform Architecture
- ~~///~~ Operating System Architecture
- ~~///~~ Storage Architecture
- ~~///~~ Business Continuity Architecture

Summary of Product Standards

Description	Review Period	Standard Type	Product or Technology	State Contract(s)
Mainframe Architecture	Annual	De Facto Sustained Sustained	IBMz800® IBM S/390® IBM AS400®	PA821
Server Architecture: UNIX Servers	Annual	De Facto De Facto De Facto Migrate From	Sun Microsystems® Hewlett Packard® IBM RS6000® All Other Vendors	PA821
Server Architecture: Windows® Servers	Annual	De Facto Sustained Sustained Emerging Migrate From	Compaq® Hewlett Packard® Gateway® Dell® All Other Vendors	MA432 MA575
Client Platform Architecture	Annual	Sustained Sustained Sustained Sustained Emerging Migrate From	GateWay® Compaq® Hewlett Packard® IBM® Dell® All Other Vendors	MA575 MA432 PC Stores MA130
Operating System Architecture: Clients	Annual	Emerging De Facto Migrate From Migrate From Migrate From Emerging	Windows® XP Windows® 2000 Windows® NT Windows® 98 Windows® 95 LINUX®	AR1429
Operating System Architecture: Enterprise Server	Annual	Sustained Best Practices Best Practices Emerging	IBM OS/390® IBM z/OS® IBM VM® LINUX®	
Operating System Architecture: UNIX Servers	Annual	De Facto Migrate From De Facto Migrate From De Facto Migrate From De Facto Emerging	Solaris® 8 or > Solaris® 8 or < Solaris® 2.6 or > Solaris® 2.6 or < HP/UX 11i or > HP/UX 11i or < IBM AIX® LINUX®	

Draft for Comment

Operating System Architecture: Windows® Servers	Annual	De Facto Migrate From	Windows® 2000 Advanced Server Windows NT® Server	AR1429
Operating System Architecture: NOS Servers	Annual	De Facto Migrate From	NetWare 6X or > Netware 6X or <	PA655
Storage Architecture: Management Software	Annual	De Facto Sustained Emerging Emerging	Tivoli Storage Management (TSM)® Storage Tek (STK)® Tape Products Vantage Brightstor® IBM DFSMS® and components	
Storage Architecture: Mass Disk Storage	Annual	De Facto Sustained Sustained Sustained	IBM Shark® Hewlett Packard® Hitachi (HDS)® EMC®	
Storage Architecture: Tape Products	Annual	De Facto De Facto De Facto	Storage Tek (STK) Tape Products STK Virtual Tape STK DLT Tape Libraries	

State Policy, Standards and Related References:

Production Data Storage Policy, Approved by the ITPSC March 28, 2002

Security Architecture

Scope

The State of Utah must maintain compliance with legal requirements for confidentiality and integrity while providing for public access to appropriate information. The State's technological resources need to be available to users across the enterprise regardless of location or platform. The State must implement security and directory services in such a manner that its information infrastructure is protected and accessible. At the same time, functionality must be unimpeded and business services need to be readily available.

The State is developing closer electronic partnerships with businesses and other organizations outside of state government. Some employees are mobile users, and some employees are working from their homes as telecommuters. State services are being brought closer to the citizen electronically through initiatives and projects supporting the Governors vision for electronic delivery of government services. The purpose of security is to protect and secure the state's information resources in order to provide an environment in which the state's business can be safely transacted. The required security services to protect the state's information infrastructure include the following technologies:

- ?? Identification - the process of distinguishing one user from all others.
- ?? Authentication - the process of verifying the identity of the user.
- ?? Authorization and access control - the means of establishing and enforcing rights and privileges allowed to users.
- ?? Administration - the functions required to establish, manage, and maintain security, and administrative services such as virus protection and content filtering.
- ?? Audit - the process of reviewing system activities that enables the reconstruction and examination of events to determine if proper procedures and policies have been followed.
- ?? Directory Services - Databases that provides a mechanism to inventory, administer, and access resources in the network.

Summary of Product Standards

Description	Review Period	Standard Type	Product or Technology	State Contract(s)
Identification Technology	Annual	De Facto De Facto De Facto Emerging	DST Certificates Unique ID/Password EIN/PIN Number Biometrics	AR1216
Authentication Technology	Annual	De Facto De Facto De Facto	eDirectory® 8.6X or > IBM RACF® RADIUS	PA655
Authorization and Access Control Technology	Annual	De Facto De Facto De Facto	SiteMinder® Cisco PIX® Firewalls Cisco Layer 3 Access Control	
Administration Technologies: Virus Detection	Annual	De Facto Migrate From Migrate From	McAfee VirusScan® Norton Anti-Virus® Innoculan®	
Administration Technologies: URL Filtering	Annual	De Facto Emerging Emerging	WebSense® Secure Computing Smart Filter	
Audit Technologies: Intrusion Detection	Annual	Approved Emerging Emerging	Cisco® Snort® Network Flight Recorder	

Draft for Comment

Audit Technologies: Vulnerability Testing	Annual	Emerging Emerging Emerging Emerging	Nessus® CIS Scanners Cisco NetSonar® NMAP	
VPN Technology	Annual	Best Practice Best Practice De Facto Emerging	Cisco VPN Concentrator SSL (>=128 bit encrypt) Cisco PIX®VPN Component Cisco VPN Accelerator for Large Cisco Devices	
File Encryption Technology	Annual	Best Practice	PGP (>=128bit encrypt)	

State Policy, Standards and Related References:

Enterprise Intrusion Detection Standard, Approved by the ITPSC 8/17/2000

HIPAA and Related Security Requirements, Draft for the ITPSC 7/26/02

Information Technology Protection, Rule 365-4, in effect as of 4/1/2002

Limiting Access to Inappropriate Internet Sites, Approved by the ITPSC 1/21/99

Network Access Policy, Approved by the ITPSC 3/28/02

State Firewall Policy, Draft Pending ITPSC Approval 8/1/02

State User Authentication Policy, Draft for review and comment by the ITPSC 6/27/02

State Information Security Charter, Approved by the ITPSC 12/21/01

State Information Security Policy, Approved by the ITPSC 12/21/01

Virus Detection Policy, Draft for review and comment for the ITPSC 6/27/02

Systems Management Architecture

Scope

Systems management architecture defines the framework for efficient and effective management of the state's information processing environment needed to support and enhance the productivity of its automated business systems. The architecture is composed of the following technology components:

- ~~///~~ Disaster Recovery and Contingency Planning Architecture
- ~~///~~ Help Desk Architecture
- ~~///~~ Operations Management Architecture
- ~~///~~ Performance Monitoring Architecture
- ~~///~~ Telecommunications Architecture

Summary of Product Standards

Description	Review Period	Standard Type	Product or Technology	State Contract(s)
Help Desk Architecture	Annual	De Facto Sustained	Seibel 7® or > Remedy	
Operations Management Architecture	Annual	De Facto	Novell ZenWorks®	PA655
Performance Monitoring & Architecture	Annual	De Facto Sustained De Facto Sustained Best Practices Best Practices Best Practices Best Practices Best Practices	MicroMuse Netcool® WebTrends® HP OpenView® Harris® Candle Corp. CICS Omegamon® IBM® RMF Monitors BMC Visualizer® IBM® Debug Tool IBM DB2 Utility Suite®	

State Policy, Standards and Related References:

Operations Acceptance Test Checklist, July 10, 2002

OAT: Operations Acceptance Test Manual, July 2002

Operational Acceptance Testing Policy for Network Centric Applications, Draft submitted for review and comment to the ITPSC on 6/27/02.

References:

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CIO Approval Date: Pending

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Author(s): Robert Woolley

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